A new species, *Culex (Culex) litwakae* (Diptera: Culicidae), from the coastal region of Kenya[1]

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ABSTRACT. *Culex (Culex) litwakae*, a new species from the coastal region of Kenya, is described and illustrated in the adult, pupal and larval stages. This species is contrasted with *Culex antennatus*, a closely related species from the Middle East and Ethiopian Region.

While sorting and classifying material collected by Dr. Yiau-Min Huang in Cameroon and Kenya, I found a species from the coastal region of Kenya which could not be identified with existing keys and descriptions. Further study revealed that this species is closely related to *Culex (Culex) antennatus* (Becker), differing only in slight but constant differences in the adult, pupal and larval stages. This species is named and fully described below as *Culex (Culex) litwakae*.

It is a pleasure to dedicate this species to Ms. Taina Litwak in appreciation of her interest and skill in producing mosquito drawings. It is impossible to fully credit Ms. Litwak for her contribution to this and several previous works. Her superb illustrations will significantly enhance many future publications.

Character measurements, setal counts and setal branching counts were made on at least ten specimens, including the holotype and/or allotype. The terminology used follows Harbach and Knight (1980) except that siphon indices were calculated using basal width rather than width measured at midlength. The term "siphon/saddle index" is used in place of "saddle/siphon index" for the ratio of siphon length to saddle length. The system of lettering the setae borne on the subapical lobe of the male gonocoxite is adopted from Edwards (1941) and Belkin (1962).

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Culex (Culex) litwakae, New Species

Adult. A small dark, brown mosquito very closely resembling *Culex antennatus* but with basal pale markings on the abdominal terga, pleura brown without any yellowish color and nearly completely dark-scaled maxillary palpi in the male. The male genitalia of these species are strikingly similar.

FEMALE. Mainly clothed with dark brown scales. *Head*: Antenna dark, length 1.30-1.68 mm, mean 1.52 mm; pedicel without scales on mesal surface; flagellum normal. Proboscis dark-scaled above, white-scaled beneath; length 1.48-1.75 mm, mean 1.65 mm. Maxillary palpus entirely dark-scaled; length 0.20-0.30 mm, mean 0.27 mm, about 0.16 length of proboscis. Forked scales of vertex rather short, all dark; falcate scales pale brown to white, usually mostly whitish; lateral spatulate scales whitish. *Thorax*: Integument brown, pleura paler than scutum. Scutum with golden brown scales of uniform size and tint, with few whitish scales on anterior promontory, scales usually paler on prescutellar area but not noticeably so; setae dark brown. Scutellar scales same as prescutellar scales; lateral lobes each with 4-6 large setae, median lobe usually with 6 large setae. Antepronotum with few scales in upper and lower patches; with prominent setae on upper part, smaller setae on lower part. Postpronotum with scales same as scutal scales; with 3-6 dark setae on posterodorsal margin. Pleural setae pale yellow, darker on prealar knob: 6-9 proepisternal, 5-8 prealar, 3-6 upper mesokatepisternal, 6-10 lower mesokatepisternal, 3-8 upper mesepimeral and 1 lower mesepimeral. Pleural scales spatulate, rather narrow and nearly white: small patch below upper proepisternal setae, patches on upper corner and lower posterior border of mesokatepisternum, anterior patch on mesepimeron at level of upper mesokatepisternal patch and small patch before upper mesepimeral setae; without postspiracular and prealar scales. *Wing*: Length 2.33-2.85 mm, mean 2.67 mm, cell R_2 2.88-4.10 of vein R_{2+3}, mean 3.43; cell M_1 0.71-0.81 of cell R_2, mean 0.77; scales entirely dark. *Halter*: Scabellum pale; pedicel and capitellum dark. *Legs*: Anterior surface of forecoxa mainly dark-scaled, with small basal and apical patches of pale scales; anterolateral surfaces of mid- and hindcoxae with longitudinal patch of pale scales. Trochanters dark-scaled anteriorly, white-scaled posteriorly. Femora without any trace of knee spots; forefemur with anterior surface dark-scaled, posterior surface white-scaled; midfemur like forefemur but dark scaling gradually expanded over dorsal surface toward apex; hindfemur mainly white-scaled, with anterodorsal dark stripe beginning beyond base, gradually widening distally and abruptly expanded over distal 0.1 of anterior surface. Foretibia mainly dark-scaled, posteroventral surface with whitish scales; midtibia dark-scaled anteriorly, whitish-scaled posteriorly; hindtibia mainly dark-scaled, with whitish scales ventrally, sometimes with very faint apical pale spot on anterior surface. Tarsi predominently dark-scaled; fore- and midtarsi paler posteriorly and ventrally; hindtarsus paler ventrally. Ungues small, simple, dark. Pulvilli distinct, whitish. *Abdomen*: Tergum I without scales except for small median posterior patch of dark scales; terga II-VII mainly dark-scaled; terga II-VI with narrow convex basomedian and small triangular basolateral white spots; basolateral spots gradually larger on successive posterior terga and sometimes reaching posterior margin on tergum VI, basomedian spots tend to reach basolateral spots on terga V and VI, particularly on VI; tergum VII with straight narrow basal white band united laterally with rather broad lateral white stripes, lateral stripes usually not visible from above; basomedian markings usually obsolete

on tergum II, sometimes on III, and occasionally on VI and VII; tergum VIII mainly pale-scaled, with some dark scales medially. Sterna II-VII with white or nearly white scales, often with narrow median line of subtle dark scales, particularly on sterna II-V; sternum VIII with broad lateral stripes of whitish scales, devoid of scales medially.

MALE. Like female except for following sexual differences. *Head*: Antenna strongly plumose, length 1.28-1.45 mm, mean 1.38 mm. Proboscis with false joint 0.53-0.57 from base; with 2-8 ventral setae in cluster immediately before false joint; length 1.70-1.86 mm, mean 1.76 mm. Length of maxillary palpus 2.15-2.52 mm, mean 2.38 mm, extending beyond tip of proboscis by length of palpomere 5 and half of 4; palpomeres 1-3 long, their combined length 0.81-0.87 of proboscis length; palpus almost entirely dark-scaled, palpomere 3 with or without very faint lateral pale scaling, palpomere 4 with inconspicuous, very narrow (usually only 1 scale in width), complete or incomplete ventral line of whitish scales; palpomere 3 with ventrolateral row of 9-14 setae before apex, palpomeres 4 and 5 densely setose. *Thorax*: Proepisternum with 8-15 setae in upper area. *Wing*: Cell R_2 1.81-2.35 of vein R_{2+3}, mean 2.02; cell M_1 0.74-0.88 of cell R_2, mean 0.81. *Legs*: Ungues dark; anterior foreunguis larger than posterior foreunguis, anterior foreunguis with small ventral tooth near midlength, posterior foreunguis with small tooth nearer base; anterior midunguis like that of foreleg but slightly larger, posterior midunguis much smaller than anterior midunguis, also smaller than anterior foreunguis, simple; hindungues small, simple. *Abdomen*: Terga without basolateral pale spots, terga II-VII with basal white bands 0.25-0.43 of tergum length; terga II-V with convex bands, band reduced or absent on II and may not reach lateral scale-free areas on III and IV, terga VI and VII with straight or slightly concave bands produced posteriorly along edge of lateral scale-free areas, produced to posterior border on VII and sometimes also on VI; tergum VIII (ventral in position) largely pale-scaled, median posterior area appearing devoid of scales but actually with subtle dark scales among long setae. Sterna II-VII with conspicuous median streak of dark scales; sternum VIII (dorsal in position) mainly pale-scaled, with some darker scales at center. *Genitalia* (Fig. 1): Ninth tergal lobes small, each with 5-13 setae (mode 7). Gonocoxite normal, ventrolateral setae strongly developed, these longer and stouter than lateral setae, lateral setae in 2 or 3 rows with 4-8 (mode 6) moderately long setae in most lateral row, mesal surface with 3 irregular rows of small setae extending from base to level of subapical lobe; subapical lobe indistinctly divided, setae *d-f* borne on slight prominence on mesal side of main lobe; setae *a-c* rodlike with blunt apices, *a* shorter than *b* and *c* and more or less straight, *b* and *c* each with stout base, tapered and slightly curved; *d-f* shorter than *a-c*, group *d-e* comprised of 3 straight slender setae with blunt tips, *f* longer than *d-e* and distinctly flattened, appearing broad in lateral view; *g* foliform, broad and strongly asymmetrical; *h* slender, bent distally. Gonostylus rather slender, curved, slightly widened before apex on lateral side, concave dorsal surface with 2 small slender setae inserted about 0.8 from base; gonostylar claw short, broadest apically, troughlike. Phallosome longer than broad with lateral plates slightly longer than aedeagus; lateral plate with inner and outer divisions; inner division (= ventral arm) differentiated as stout sinuous process, curved over denticles of outer division with free end pointed and bent caudad; caudal margin of outer division with row of 5-8 denticles (mode 6) projecting over prominent lateral ridge, dorsal end of ridge produced into projecting lobe with its apex more or less pointed and recurved laterad; base of outer division with

thumblike dorsal process, base of this process continuous mesally with dorsal aedeagal bridge. Aedeagus conical; ventral aedeagal bridge narrow, joining aedeagal sclerites near midlength. Proctiger normal; paraproct with rather short and broad basal lateral arm, crown dark with numerous short spinelike spicules and some shorter simple blades. Cercal sclerite elongate, broadest posteriorly; 2 or 3 cercal setae, usually 2. Tergum X straplike, joining base of paraproct below basal lateral arm.

Pupa (Fig. 1). Character and positions of setae as figured; range and modal number of branches listed in Table 1. *Cephalothorax*: Lightly tanned, legs, scutum, metanotum and metathoracic wings darker. Seta 1-CT usually with 4 branches (3-6); 2-CT with 4 or 5 branches; 3-CT usually triple, sometimes with 4 branches; 7,11-CT normally double, 7-CT seldom triple, 11-CT infrequently single; 8-CT frequently with 5 or 6 branches (4-7); 9-CT usually triple, occasionally double, seldom with 4 branches; 10-CT variable, most often with 8 branches (6-18); 12-CT commonly with 4 or 5 branches (3-6). *Trumpet*: Tracheoid area moderately tanned, remainder lightly tanned; rather long and narrow, not distinctly widened distally, index 5.33-7.92, mean 6.55 (20 trumpets); tracheoid area long, nearly 0.5 of trumpet length; pinna short, about 0.20 or less of trumpet length. *Abdomen*: Lightly tanned, anterior margins of terga darker, particularly on terga I-IV; length 2.22-2.73 mm, mean 2.46 mm. Seta 6-I,II normally single; 7-I,II usually double, about 0.5 length of 6-I,II, respectively; 1-II multiple (16-39); 1-III-VII strongly developed, multiple; 3-VII variable, often with 5 or 6 branches, sometimes with 4, seldom triple; 5-III frequently with 8 branches (6-9), about 0.5 length of 1-III; 5-IV most often with 6 branches (4-8), about same length as 1-IV; 5-V,VI usually triple (2-5), 5-V longer than 5-VI, both distinctly longer than 1-V,VI; 6-III,IV not developed as well as 6-V,VI, usually with 4 or 5 branches (3-8); 6-V,VI strongly developed, longer than 6-III,IV and usually with 6 or 7 branches (5-8). *Genital lobe*: Lightly tanned; length 0.15-0.16 mm in female, 0.30-0.32 mm in male. *Paddle*: Lightly tanned, buttress and midrib darker; outer margin without distinct spicules; midrib distinct except at apex; length 0.63-0.78 mm, mean 0.72 mm, width 0.43-0.56 mm, mean 0.50 mm, index 1.26-1.68, mean 1.45 (20 paddles).

Larva (Fig. 2). Character and placement of setae as figured; range and modal number of branches given in Table 2. *Head*: Wider than long; length 0.65-0.74 mm, mean 0.70 mm; width 1.06-1.10 mm, mean 1.08 mm; lightly tanned, lateralia slightly darker behind eyes, collar heavily tanned. Median labral plate narrow, not noticeably emarginate between insertions of seta 1-C. Hypostomal suture moderately tanned, diverging only slightly from its mate of the opposite side, extended posteriad of posterior tentorial pit but distinctly ending before collar. Dorsomentum most often with 7 teeth (6-8) on either side of median tooth. Seta 1-C slender, slightly bent mesad and moderately tanned, length 0.08-0.10 mm; 2-C absent; 5,6-C normally double, rarely single; 7-C most often with 6 branches (5-7); 11-C usually triple (2-5); 13-C strongly developed, usually with 3 or 4 branches (2-5); 14-C normally double with strongly divergent branches, seldom triple. *Antenna*: Length 0.52-0.58 mm, mean 0.54 mm, about 0.75 length of head; lightly tanned, basal margin and distal part from level of seta 1-A moderately tanned; dorsal and lateral surfaces of proximal part with long aciculae, these becoming shorter and stouter near seta 1-A, distal part slender and smooth except for few short stout aciculae on lateral surface. Seta 1-A with about 24 branches (21-28). *Thorax*: Integument hyaline, smooth; tubercles of pleural setal groups

moderately tanned. Seta 3-P rather short, about 0.5 length of 1-P; 7-P normally triple, rarely double; 11-P usually with 5 or 6 branches, more often with 6 (5-8). Seta 1-M normally single or double, seldom triple; 4-M usually double or triple, rarely single. Seta 1-T very short, about 0.25 length of 2-T, frequently double (2-4); 7-T usually with 6 branches (5-8); 9-T normally with 4 or 5 branches, rarely with 6. *Abdomen*: Integument hyaline, smooth except for some minute spicules around comb. Seta 6-I-VI long, commonly triple, 6-I usually triple (2-4), 6-II always triple, 6-III usually double or triple (2-4), 6-IV more often with 4 branches (2-4), 6-V most often triple (2-5) and 6-VI usually triple, often double, sometimes with 4 branches and seldom single (of 80 seta 6-VI examined, 3 were single, 22 double, 44 triple and 11 with 4 branches); seta 1-III-VI commonly triple (1-III,VI usually triple, 1-IV most often triple and 1-V most often double); seta 13-III-V with 2-6 branches, 13-III usually with 3 or 4 branches, more often 4, 13-IV,V usually with 4 or 5 branches, 13-IV more often with 4 and 13-V more often with 5. *Segment VIII*: Comb with 28-44 scales, mean 35; scales short, evenly fringed on sides and apex (apical fringe stronger); arranged in 3 or 4 irregular rows. *Siphon*: Index 5.91-8.54 (width measured at base), mean 7.28 (49 siphons); moderately tanned, basal rim and acus darkened. Pecten of 10-16 spines, mean 13, on basal 0.30 of siphon; spines increasing in size from base, larger spines rather stout, distinctly curved and usually with 2, occasionally 3, basal denticles. Seta 1-S usually in 5 pairs (of 50 siphons examined, 2 with 4 pairs, 13 with 4.5 pairs, 33 with 5 pairs and 2 with 5.5 pairs), 3 pairs (1a,b,d-S) inserted posterolaterally, 2 pairs (1c,e-S) inserted laterally, 1e-S usually distal to 1d-S but sometimes at same level or slightly proximal to it, all usually distad of pecten and only slightly longer than 0.5 width of siphon at point of insertion. *Segment X*: Saddle complete; lightly tanned; posterodorsal area with minute spicules; length 0.31-0.38 mm, mean 0.34 mm, siphon/saddle index 4.13-5.00, mean 4.55. Seta 1-X frequently with 4 branches (2-5); 2-X double; 4-X in 6 pairs, all borne on grid. Anal papillae subacutely tapered, dorsal pair longer than ventral pair, ventral pair about length of saddle.

Type data. The type series contains 27 males, 23 females, 44 larval exuviae, 47 pupal exuviae and 9 fourth-instar larvae. Holotype male with associated larval and pupal exuviae and genitalia on slides: KENYA, Coast Region, Mambasa District, Mazeras, May 19, 1983, Coll. Y.M. Huang, specimen no. 155-18, SAMP accession no. 1035, collected as larva from medium-sized ground pool in full sun. Allotype female, specimen no. 155-23, with larval and pupal exuviae and same data as holotype. Paratypes: 10 males, 2 females (1 male without larval and pupal exuviae, specimen no. 155-10; others with larval and pupal exuviae, specimen nos. 155-11 through -16, -19, -20, -21, -24, -25) with same data as holotype; 16 males, 20 females from 4 other collections with same data as holotype except as follows: 1 male and 1 female with larval and pupal exuviae (specimen nos. 149-11, -14), May 18, 1983, collected from medium-sized pond (?) in partial shade; 1 female without larval and pupal exuviae (specimen no. 153-17), 1 male and 2 females with pupal exuviae (specimen nos. 153-100, -101, -102), 13 males and 12 females with larval and pupal exuviae (specimen nos. 153-10 through -16, -18 through -34 and -36) and 9 fourth-instar larvae (specimen nos. 153a-c, e-i, l) collected same date from large ground pool in full sun; 1 female without larval and pupal exuviae (specimen no. 156-12), May 20, 1983, collected as larva from medium-sized drainage ditch in full sun; 1 male and 3 females with larval and pupal exuviae (specimen nos. 157-10 through -13), 20 May 1983, collected from

roadside ditch with areas of partial shade and full sun. Male genitalia of 10 paratypes (specimen nos. 149-11; 153-11, -12, -20, -25, -33, -101; 155-15, -24; 157-11) were dissected and mounted on slides. Five paratypes, 2 males and 2 females with associated larval and pupal exuviae (specimen nos. 153-19, -27; 155-15, -19) and 1 fourth-instar larva (specimen no. 153e) deposited in the British Museum (Natural History), London. Another 5 paratypes, 2 males and 2 females with associated larval and pupal exuviae (specimen nos. 153-10, -12, -14; 155-14) and 1 fourth-instar larva (specimen no. 153g) entrusted to the Division of Vector-Borne Diseases, Ministry of Health, Nairobi, Kenya. Holotype, allotype and remaining paratypes deposited in the National Museum of Natural History, Smithsonian Institution, Washington, DC.

Bionomics. The type specimens were collected as larvae from temporary or semipermanent bodies of stagnant water with mud on the bottom and emergent grassy vegetation. The collection sites included a medium-sized pond (?), large marshy ground pool, medium-sized ground pool, roadside ditch and a drainage ditch. Three of the sites were in full sun; two were partially shaded.

Discussion. *Culex litwakae* is very closely related to *antennatus* from the Middle East and Ethiopian Region. These species are members of the *decens* group but are distinguished easily from the nominate species by the absence of apical dark bands on the abdominal sterna, differently developed lateral plate of the male phallosome and the much shorter siphon and seta 1-IV,V of the larva.

In the adult, *litwakae* is differentiated most easily from *antennatus* by the presence of basal pale bands on the abdominal terga, which are usually reduced to median spots in the female. There are no traces of knee spots in *litwakae*, but specimens of *antennatus* from Egypt (type locality is Cairo) bear inconspicuous knee spots on all femora. Males of these species exhibit small but constant differences in the character of the maxillary palpus and lateral plate of the phallosome. The maxillary palpus of *litwakae* is dark-scaled except for a very narrow, inconspicuous ventral line of white scales on palpomere 4. In *antennatus*, palpomeres 4 and 5 each have a spot of white scales ventrally at the base, and palpomere 4 also has a short ventral line of white scales before the apex. The lateral plate of *litwakae* is very similar to that of *antennatus*, but the inner division is more erect and extends farther caudad. The outer division is differently toothed: *litwakae* has 5-8 (usually 6) rather slender denticles which project laterad while *antennatus* has 3-5 (usually 4) rather stout denticles directed dorsolaterad (*cf.* Fig. 116 in Edwards 1941).

The adults of *litwakae* key fairly easily to *Culex pipiens* Linnaeus in Edwards' (1941) key to the *Culex (Culex)* of the Ethiopian Region. *Culex litwakae* bears some resemblance to *pipiens*, particularly to those females with reduced abdominal banding, but this resemblance is only superficial. This species is easily distinguished from *pipiens* by its smaller size, brownish color, absence of knee spots and absence of a distinct pale spot at the tip of the hindtibia.

The pupae of *litwakae* and *antennatus* are very similar but appear to be separable by the character of the trumpets. The trumpet is generally longer and distinctly narrower in *litwakae*. Trumpet indices range from 5.33 to 7.92

(mean 6.55) in *litwakae*, and from 4.34 to 6.46 (mean 5.17) in Egyptian specimens of *antennatus*. Trumpet width varies from 60 to 95 µm (mean 83 µm) in the former, and from 96-164 µm (mean 126 µm) in the latter. The trumpets also differ in the length of the pinna: 65-125 µm (mean 95 µm) for *litwakae* versus 172-228 µm (mean 191 µm) for *antennatus*. The pupal chaetotaxy of these species is virtually identical. This is based on a comparison between *litwakae* and Egyptian specimens of *antennatus*. Egyptian specimens agree with Edwards' (1941) description based on pupal exuviae from Kampala, Uganda.

The larva of *litwakae* closely resembles both *antennatus* and *Culex nakuruensis* Mattingly, and there may be difficulty in differentiating some specimens. The most reliable character to distinguish *litwakae* from *antennatus* is the development of seta 6-VI. This seta is usually triple in *litwakae* (see description) and always single in *antennatus* (based on the examination of 40 specimens from Egypt and 1 from Senegal). These species also differ in the character of seta 1-S and the development of the pecten spines. The siphon of *litwakae* usually bears 5 pairs of seta 1-S (3 posterolateral and 2 lateral), and the larger pecten spines are distinctly curved with 2 or 3 basal denticles (normally 2). In *antennatus*, seta 1-S normally occurs in 5 or 6 pairs (2 or 3 posterolateral and 3 lateral), and the larger pecten spines are longer, straighter, more slender and have 2-4 denticles (usually 3). Based on the description published by van Someren (1967), the larva of *nakuruensis* appears to differ chiefly from both *litwakae* and *antennatus* in the development of setae 5,6-C and 2-X. In *nakuruensis*, seta 5-C has 4-6 branches while 6-C and 2-X have 3 or 4 branches. These setae are normally double in both *litwakae* and *antennatus*. Setae 5,6-C are sometimes triple in the latter.

The larva of *litwakae* keys readily to couplet 62 in Hopkins' (1952) key to the *Culex* larvae of the Ethiopian Region. This couplet separates *Culex telesilla* De Meillon and Lavoipierre and *Culex perfuscus* Edwards. All three species can be distinguished with the following modification of the couplet. Some details are added from the descriptions provided by Hopkins.

60. Antenna tapering abruptly just beyond seta 1-A; first pair of seta 1-S arising before end of pecten . . . . . **telesilla**

Antenna tapering much more gradually; first pair of seta 1-S arising beyond pecten 60a

60a. Seta 1-C slender; siphon without anterolateral setae; seta 2-X double . . . . . **litwakae**

Seta 1-C stout; siphon with 3 pairs of anterolateral setae; seta 2-X with 3 or 4 branches . . **perfuscus**

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Table 1. Number of branches for pupal setae of *Culex (Culex) litwakae*.[a]

Seta No.	Cephalothorax CT	Abdominal Segments I	II	III	IV	V	VI	VII	VIII	IX	Paddle P
0	-	-	1,2(1)	1,2(1)	1	1	1	1	1	-	-
1	3-6(4)[b]	64-108(91)	16-39(25)	9-15(12)	8-13(10)	6-11(9)	6-10(9)	5-8(6)	-	1	1,2(1)
2	4,5(4)	1	1	1	1	1	1	1,2(1)	-	-	1
3	3,4(3)	1-3(2)	2,3(2)	2,3(2)	4-10(7)	2,3(2)	1-3(2)	3-6(6)	-	-	-
4	3-5(4)	5-8(7)	4-6(4)	4-11(6)	2-6(4)	4-7(6)	3-6(4)	1-3(2)	2,3(2)	-	-
5	4-7(6)	3-7(5)	5-8(6)	6-9(8)	4-8(6)	2-4(3)	2-5(3)	2-4(2)	-	-	-
6	2-5(4)	1	1,2(1)	3-7(4)	4-8(5)	5-8(6)	5-8(6)	8-13(8)	-	-	-
7	2,3(2)	1-3(2)	2	4-8(6)	4-7(4)	6-9(6)	1	1,2(1)	-	-	-
8	4-7(5)	-	-	2-6(5)	2-5(3)	3-6(3)	3-6(4)	3-5(4)	-	-	-
9	2-4(3)	1,2(2)	1	1	1	1	1	3-6(4)	6-9(9)	-	-
10	6-18(8)	-[c]	-	2	2	1	1	1,2(1)	-	-	-
11	1,2(2)	1,2(2)	-	1	1	1-3(2)	2,3(2)	1-3(3)	-	-	-
12	3-6(4)	-	-	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-	-
14	-	-	-	1	1	1	1	1	1	-	-

[a] Based on counts made on the holotype and 9 paratypes.
[b] Range (mode).
[c] Alveolus only.

Table 2. Number of branches for fourth-instar larval setae of *Culex (Culex) litwakae*. [a]

Seta No.	Head	Thorax			Abdominal Segments								
	C	P	M	T	I	II	III	IV	V	VI	VII	VIII	X
0	1	12-29(18)[b]	-	-	-	1	1	1	1	1	1	1	-
1	1	1	1-3(2)	2-4(2)	2-6(4)	1-3(2)	2-5(3)	2-4(3)	1-4(2)	2-4(3)	4-6(5)	5-9(6)	2-5(4)
2	-	1	3-6(4)	1-5(3)	1	1	1	1	1	1	1	1,2(1)	2
3	1	1	1-3(1)	3-7(6)	2-5(3)	1-4(3)	2,3(2)	2-4(3)	1,2(1)	1,2(1)	3-6(3)	6-10(7)	1
4	1	2	1-3(3)	2-5(4)	8-14(12))	2-9(5)	1-4(3)	2-4(2)	4-9(6)	1-4(3)	1,2(1)	1,2(1)	5-11(9)
5	1,2(2)	1	1	1,2(1)	4-11(6)	2-4(3)	2-4(3)	2-5(2)	1-3(2)	1-4(2)	2,3(3)	4,5(5)	-
6	1,2(2)	1	1	1	2-4(3)	3	2-4(2)	2-4(4)	2-5(3)	1-4(3)	10-22(15)	-	-
7	5-7(6)	2,3(3)	1	5-8(6)	1,2(2)	5-9(7)	7-11(7))	5-9(7)	5-10(7))	1-3(2)	1,2(1)	1a-S,	2-5(3)
8	2-7(5)	2-4(2)	4-6(5)	5-12(8)	-	1-3(2)	1,2(2)	1,2(2)	2	2-4(3)	4-7(6)	1b-S[c]	3,4(4)
9	4-8(6)	1	3-5(4)	4-6(5)	2-5(3)	1	1	1	1	1	1-4(2)	1c-S,	2-5(3)
10	1-4(2)	1	1	1	1	1	1,2(1)	1,2(1)	1	1	1	1d-S,	1-5(3)
11	2-5(3)	5-8(6)	2,3(2)	1-3(2)	3-8(4)	2-4(3)	1-3(2)	1-3(2)	1-4(2)	2,3(2)	2,3(3)	1e-S,	1-3(3)
12	3-6(4)	1	1	1-4(2)	2,3(2)	1-3(2)	1-3(2)	1,2(2)	1,2(1)	1	1	-	-
13	2-5(4)	-	23-38(28)	6-11(9)	1-4(2)	12-23(18)	2-6(4)	3-5(4)	3-6(5)	22-37(30)	2-6(4)	-	-
14	2,3(2)	1	13-28(19)	-	-	-	1	1	1	1	1	1	-
15	4-9(6)	-	-	-	-	-	-	-	-	-	-	-	-

[a] Based on counts made on the holotype and 9 paratypes.
[b] Range (mode).
[c] Seta 1b-S sometimes unpaired.

Fig. 1

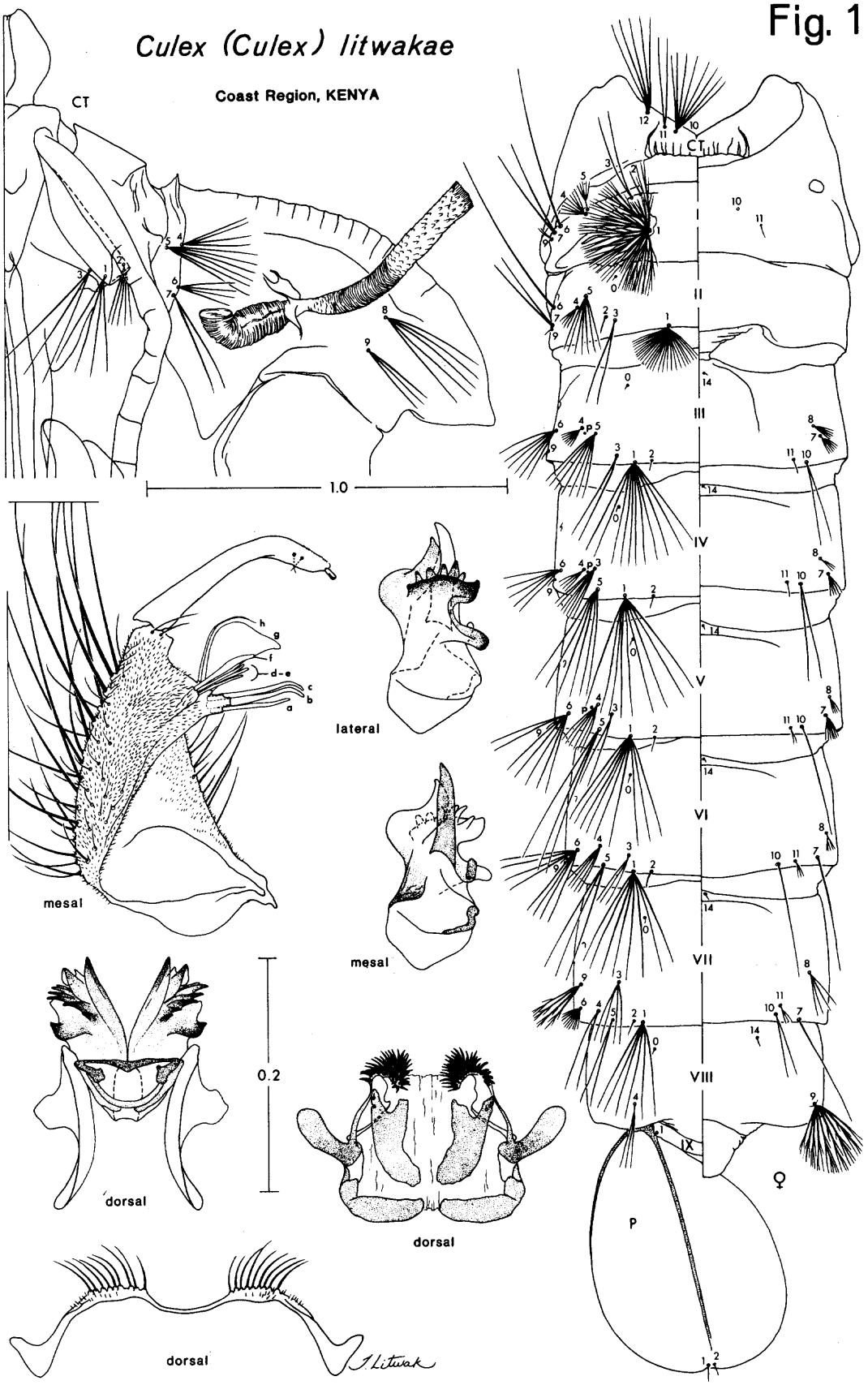
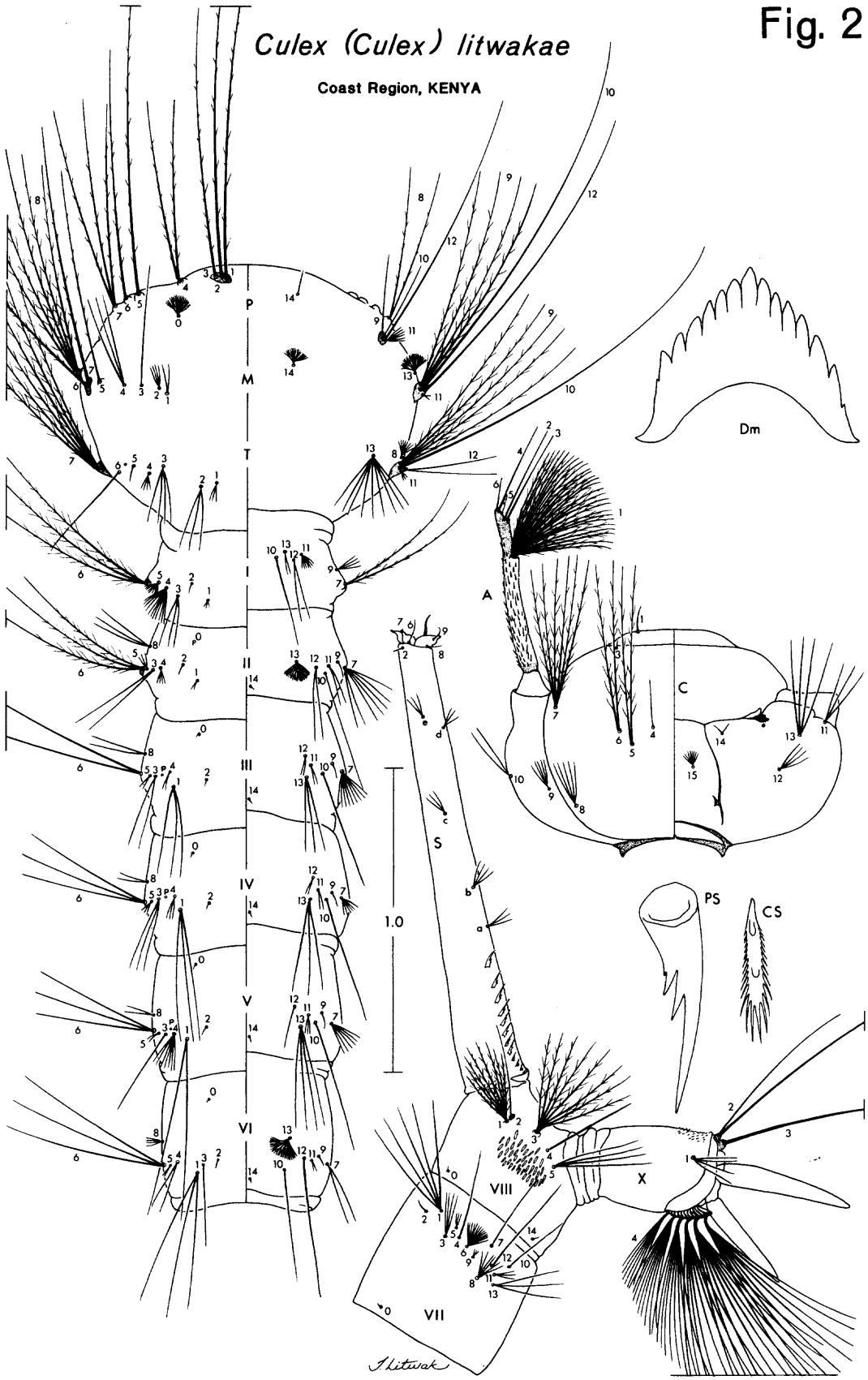

Culex (Culex) litwakae
Coast Region, KENYA
CT
1.0
lateral
mesal
mesal
0.2
dorsal
dorsal
dorsal
I
II
III
IV
V
VI
VII
VIII
IX
♀
P

Fig. 2


Culex (Culex) litwakae
Coast Region, KENYA
P
M
T
I
II
III
IV
V
VI
VII
VIII
S
1.0
Dm
A
C
PS
CS
X
J. Litwak